

MULTIPLAYER ELECTRONIC GAMES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates broadly to computer (or "video") games. More particularly, the present invention relates to computer games for play by two or more players at the same time, and, preferably at the same location.

2. State of the Art

With the advent of relatively inexpensive desktop computers, the computer game has become a major source of entertainment for both children and adults. Many of the original computer games were games for single players, and many computer games today remain oriented to the individual player. Other older computer games allowed two players to take turns competing against the computer or to compete against each other for high scores. More recently, computer games such as Acrophobia by Berkley Systems have provided for multiple competing players over the Internet.

While multiplayer games have proliferated, the computer game market tends to be driven by action games which attract boys. Indeed, to date, almost all commercially successful computer games have been written for and marketed to boys of all ages.

1 Institutes have been set up, research conducted on, and even a
2 company devoted to attracting girls to the computer game market.
3 (See, e.g., Research Highlights of Purple Moon Web Site - Summary
4 of National Research: Process and Results, How Gender Differences
5 Affect Play Behavior of Girls and Boys Ages 7-12.) However, to
6 date the successes have been few. Indeed, while the research has
7 suggested that at least five criteria (set forth in Chart A below
8 taken from the Purple Moon Web Site) are required to produce a
9 successful computer game for girls, the games that have been
10 produced have still not been particularly successful.

11
12 CHART A

- 13 a) Leading characters are everyday people that girls can easily relate to, and are as real to girls as
14 their best friends
15 b) Goal is to explore and have new experiences, with degrees of success and varying outcomes
16 c) Play focuses on multi-sensory immersion, discovery, and strong story lines
17 d) Feature everyday "real life" settings as well as new places to explore
18 e) Success comes through development of friendships
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19
20
21 It is the hypothesis of the present inventors that while the
22 criteria set forth in Chart A are desirable and perhaps necessary
23 for a successful computer game for girls, the criteria are either
24 insufficient; or those skilled in the art have been unable to

1 provide games based on the listed criteria because new game
2 techniques and concepts are required.

3
4 U.S. Patent Number 4,738,451, reissued as Re. 35,314,
5 discloses a video maze game for multiple players where the players
6 must cooperate at points in the game in order to complete the
7 game. Only one mode of cooperation is required and it is
8 relatively simple. The entire game field is larger than the video
9 display but is scrollable in four directions. Each player appears
10 as a character on the game field. Limited cooperation among
11 players is forced by requiring that all characters be visible at
12 all times. Thus, in order to scroll the game field, all of the
13 characters must cooperate (either knowingly or inadvertently) to
14 move in the same direction.

15
16 U.S. Patent Number 5,405,151 also discloses a multi-player
17 video game which has "a cooperative mode" and a "competition
18 mode". Unlike, the '451 patent, the game disclosed in this patent
19 does not require any cooperation among the players and the
20 "cooperative mode" does not involve cooperation among players as
21 that term is used in the '451 patent. The "cooperative mode"
22 disclosed in the '151 patent is when one player takes control of
23 more than one character on the game field. In the '151 patent
24 "cooperative mode" means that two characters perform the same
25 actions in response to the control by a single player. In the

1 '451 patent, and as used herein generally, "cooperation" among
2 players means that players perform acts which complement each
3 other to achieve what could not be achieved by a single player.
4

5 U.S. Patent Number 5,730,654 discloses as prior art a multi-
6 player video game for health education. In the prior art video
7 game, each player controls a character whose health may depend on
8 the healthy behavior of other characters. Thus, in order to
9 successfully complete the game, players must cooperate in general
10 ways such as sharing common resources and engaging in healthy
11 behavior.
12

13 U.S. Patent Number 5,470,080 discloses a video game apparatus
14 with a single screen mode and a split screen mode. The game
15 involves moving a game character across a scrolling background.
16 The single screen mode is used when the game is played by a single
17 player and the split screen mode is used when the game is played
18 by two players. In the split screen mode, each player controls a
19 game character which moves across an independently scrolling
20 background.
21

22 SUMMARY OF THE INVENTION 23

24 It is therefore an object of the invention to provide
25 interactive multiplayer computer games.

1 It is another object of the invention to provide computer
2 games with two characters separately controllable by two players.

3
4 It is a further object of the invention to provide a computer
5 game with two separately controllable characters where the
6 characters must cooperate at times in order to be successful in
7 completing the game.

8
9 It is an additional object of the invention to provide an
10 interactive computer game which is simultaneously played by two
11 players at a single computer.

12
13 Another object of the invention is to provide an interactive
14 computer game with two separately controllable characters where a
15 single computer monitor is controlled to show separate screens
16 when the characters are in different locations, and a single
17 screen when the characters are at the same location.

18
19 A further object of the invention is to provide new
20 interaction mechanisms for characters in an interactive computer
21 game.

22
23 An additional object of the invention is to provide a
24 computer game with two input devices to a single computer which is
25 controlled by two players, where the players will interact with

1 each other to cause two characters to cooperate with each other in
2 order to advance the game.

3
4 Yet another object of the invention is to provide a computer
5 game which fosters interaction and cooperation between the players
6 and where the outcome of the game is win-win or lose-lose rather
7 than win-lose.

8
9 Even a further object of the invention is to provide a
10 computer game with at least two separately controllable
11 characters, where the characters must be made to work both
12 independently and together in order to complete the game.

13
14 In accord with the objects of the invention, a computer game
15 is provided which includes at least two characters which are
16 separately controllable. According to a first preferred aspect of
17 the invention, in order to advance or complete the game, the
18 characters must cooperate with each other. The cooperation may
19 take a simple form such as one character holding a door open while
20 another searches a room; or a more complex form such as two
21 characters pulling on a single object together (requiring a "click
22 and drag" at the same time); or even a more complex interaction
23 form such one character handing an object to the other which
24 requires a "take" click from the "handee" within a given time
25 period (e.g., .1 seconds) of a "release" click from the "handler"

1 to avoid dropping the object. Further, the cooperation required
2 of the players may involve a "division of labor" cooperation where
3 the characters work separately but dependently.

4
5 According to a second preferred aspect of the invention, not
6 only must the characters cooperate with each other to complete the
7 game, but there are portions of the game where the characters must
8 work separately and/or independently.

9
10 According to a third preferred aspect of the invention, the
11 screen coupled to the computer is controlled to provide two
12 separate pictures; i.e., a split screen, with one of the
13 separately controllable characters working in one environment, and
14 the second working in another environment. When the characters
15 are functioning in the same environment, the screens are merged
16 into a single picture. Also, according to a preferred embodiment
17 of the invention, the actions of a first character in a first
18 environment will have a causation effect with respect to the other
19 character. In other words, if a first character cuts down a tree
20 at a particular location, if the second character goes to that
21 location at a later time, the second character will see a cut down
22 tree.

23
24 According to a fourth preferred aspect of the invention, the
25 at least two separately controllable characters are controlled by

1 at least two input devices coupled to a single computer. The at
2 least two input devices may include a first mouse and a second
3 mouse, a mouse and another input device, or two or more input
4 devices such as joysticks, trackballs, gamepads, etc.
5 Alternatively, certain keys at opposite ends of a single keyboard
6 may be utilized to control the separately controllable characters.

7
8 The preferred aspects of the invention are preferably
9 utilized in conjunction with a strong story line which includes
10 two or more controllable characters. The requirement that the
11 characters cooperate in order to advance or complete the game
12 requires interaction and cooperation between the players. This
13 required interaction and cooperation between players is believed
14 by the inventors to be an ingredient or criteria which is missing
15 from the prior art but which is necessary for the success of a
16 girl-directed computer game. In addition, incorporation of the
17 criteria of Chart A into the computer game is desirable in
18 providing a computer game which girls will want to play.
19 Furthermore, it is believed that the split-screen/merged-screen
20 aspect of the invention is a desirable tool for fostering a
21 playing environment which indicates separate and/or independent
22 play, and cooperative play, which are both required for advancing
23 the game. Further yet, it is believed that various aspects of the
24 invention can be used alone or together to provide a new genre of

1 computer games which will be popular with both genders and all
2 ages of computer game players.

3
4 Additional objects and advantages of the invention will
5 become apparent to those skilled in the art upon reference to the
6 detailed description taken in conjunction with the provided
7 figures.

8
9 BRIEF DESCRIPTION OF THE DRAWINGS

10
11 Figure 1 is a schematic diagram of a two player game
12 according to the invention with a split-screen separate view for
13 each player;
14

15 Figure 2 is a schematic diagram of a merged-screen single
16 view for both players;
17

18 Figure 3 is a simplified flow chart illustrating game play
19 from the start of a game entering into split-screen mode;
20

21 Figure 4 is a chart similar to Figure 3 showing an alternate
22 embodiment of game play;
23

24 Figure 5 is a simplified flow chart illustrating game play
25 during cooperation mode;

1 Figure 6 is simplified flow chart illustrating game play
2 during a non-cooperation mode in single-screen mode;

3
4 Figure 7 is a simplified flow chart illustrating game play
5 which includes a split-screen cooperation mode;

6
7 Figure 8 is a simplified map of game scenes indicating moves
8 which may be made without cooperation and moves which require
9 cooperation;

10
11 Figure 9 is a simplified flow chart of software control for
12 an example of simple cooperative interaction between characters;

13
14 Figure 10 is a simplified flow chart of software control for
15 an example of coordinated cooperative action between characters;
16 and

17
18 Figure 11 is a simplified flow chart of software control for
19 an example of complex coordinated cooperative action between
20 characters.

21
22 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS
23

24 Referring now to Figures 1 and 2, the electronic game
25 according to the invention is preferably embodied as software

1 which is designed to be used with a conventional personal
2 computer. The software may be distributed on CDROM, DVD,
3 diskette, or via the Internet. However, the game according to the
4 invention may also be embodied in a dedicated hardware unit or in
5 a "video game cartridge" or the like. In any case, in order to
6 play the game, it is necessary to provide a processor 10, a video
7 display 12, and one or more input devices 14 for receiving input
8 from at least two players. According to one aspect of the game,
9 the video display 12 and the processor 10 must be able to change
10 the display from a split-screen as shown in Figure 1 with two
11 different images 12a and 12b to a single-screen as shown in Figure
12 2 with a single image 12c and vice versa depending on factors
13 which are described below with reference to Figures 3-7. As shown
14 in the Figures, the input device 14 may be a conventional keyboard
15 where some keys 14a at the left end of the keyboard receiving
16 input from "Player 1" and some keys 14b at the right end of the
17 keyboard receiving input from "Player 2". Accordingly, when the
18 display 12 is in the split-screen mode, the image 12a on the left
19 side of the screen will be associated with "Player 1" and will
20 respond to the input keys 14a whereas the image 12b on the right
21 side of the screen will be associated with "Player 2" and will
22 respond to the input keys 14b. Those skilled in the art will
23 appreciate that the input device need not be a shared keyboard and
24 that each player may be provided with a separate input device. A
25 suitable input device includes a mouse, a joystick, a trackball, a

1 gamepad controller, etc. Preferably both players utilize the same
2 type of input device, although different input devices can be
3 utilized.

4

5 The presently preferred embodiment of the electronic game
6 according to the invention is what is often referred to as an
7 "adventure game". As used herein, "adventure game" means a game
8 where the players must traverse different landscapes, find things,
9 solve puzzles, and perform tasks in order to complete (win) the
10 game. Those skilled in the art will appreciate that known
11 electronic adventure games often utilize a "first person" display.
12 That is, the player sees the world of the adventure on the screen
13 ^{bw} bud does not see herself as a character on the screen. However;
14 it is not uncommon in the art to utilize a third person display
15 where the player views a character on the screen and controls the
16 movements of the character with the input device. Further, it is
17 known in the art to provide a kind of hybrid first-third person
18 display where the player sees her character at some times and sees
19 through the eyes of her character at other times. The present
20 invention may utilize either a first person display, a third
21 person display, or a hybrid first-third person display. The
22 exemplary displays shown in Figures 1 and 2 are illustrated as
23 third person displays. In particular, as shown in Figure 1,
24 "Player 1" sees herself walking and carrying two infants and
25 "Player 2" sees herself running towards a house. As shown in

1 Figure 2, both players see each other pulling a small boat
2 carrying children onto a shore. As will be appreciated from the
3 description which follows, a third person or hybrid first-third
4 person display is preferred, particularly when the game is in
5 single screen mode so that the players can see each other.

6

7 Although the invention may provide for more than two players,
8 the presently preferred embodiment is a two player game and the
9 game will be described herein with reference to only two players.

10 From the description given herein, however, those skilled in the
11 art will appreciate how the inventive aspects of the game may be
12 applied to a game for more than two players. Further, the
13 presently preferred embodiment of the game utilizes a single video
14 display and switches between single-screen and split-screen modes
15 in an inventive manner as described below with reference to
16 Figures 3-7. As mentioned above, the game according to the
17 invention is designed to appeal particularly to girls. The
18 inventors believe that the use of a single video display with
19 single-screen and split-screen modes for two players will be
20 appealing to girls because it allows close interaction between the
21 two players as well as interaction between the players
22 (individually and jointly) and the game. From the description
23 given herein, however, those skilled in the art will appreciate
24 that many of the inventive aspects of the game may be applied

1 while using multiple video displays and that the video displays
2 and respective players may be located close together or far apart.

3

4 Turning now to Figure 3, a simplified embodiment of game play
5 according to the invention will be described with reference to
6 different types of "scenes". As used herein the term "scene" is
7 intended to mean a point in the game where certain actions and
8 results are possible as well as different images such as the
9 images 12a-12c shown in Figures 1 and 2. Those skilled in the art
10 of adventure games will appreciate that during game play a change
11 in the image on the screen does not always provide a change in the
12 actions and results which are possible at that point in the game.
13 Changes in the screen image which are irrelevant to the completion
14 of the game are sometimes referred to as "eye candy". In
15 addition, different points in the game may display the same image
16 but are different "scenes" because actions and results are
17 possible. For example, a scene of a door to a room may look
18 identical on the video display regardless of whether the player is
19 carrying a key to the door. In the description which follows, the
20 term "scene" may have different meanings depending on the context
21 of the game. Generally, it is intended that the term "scene"
22 include both changes in the displayed image as well as
23 imperceptible changes in the player's position in the game where
24 the actions or results which are possible have changed even though
25 the image on the screen remains the same. In some instances,

1 however, the term "scene" will only refer to the visual display.
2 The scenes described below are defined as being either a "Type-N"
3 scene or a "Type-C" scene. As used herein a "Type-N" scene is a
4 scene which may be entered by one player without the cooperation
5 of the other player. A "Type-C" scene is one which may be entered
6 only if both players cooperate. In some instances cooperation of
7 the players will permit both players to enter the "Type-C" scene
8 and in other instances cooperation of the players will permit only
9 one of the players to enter the "Type-C" scene. Generally,
10 according to the simplified embodiment illustrated in Figure 3,
11 whenever cooperation is required, the video display is in single-
12 screen mode. However, when cooperation is not required, the
13 display may be in either single-screen or split-screen mode
14 depending on the relative locations of the players. Thus,
15 according to this embodiment, there may be scenes which are
16 displayed in the single-screen mode even though cooperation is not
17 required. To distinguish these two different modes using a
18 single-screen display, the latter is referred to herein as non-
19 cooperative single screen mode or NCSS mode.

20
21 With these definitions in mind, Figure 3 shows that after
22 starting the game at 20, a prologue animation is preferably played
23 at 22 in single-screen mode. The prologue introduces the players
24 to the story which will be played out in the game and may also
25 include instructions for playing the game, hints, etc. The

1 prologue ends at 24 where the players, using their input devices,
2 choose a direction in which to move. (It will be appreciated,
3 however, that the prologue could end by presenting a split screen
4 mode where each player has little or no choice as to which
5 direction to move.) For example, if the input device is a mouse,
6 moving the mouse to the right side of the screen will cause the
7 display to scroll to the left revealing what was to the right of
8 the initial display. If the players choose different directions,
9 the display changes to split-screen mode at 26. If the players
10 choose to move in the same direction, the display will remain in
11 single screen mode as indicated at 28 even though cooperation may
12 not be required at this stage of the game. Following the switch
13 to split-screen at 26, the left side of the video display will
14 display "Scene A" for "Player 1" (illustrated at 30 in Figure 3)
15 and the right side of the video display will display "Scene B" for
16 "Player 2" (illustrated at 32 in Figure 3). The game is then run
17 in two parallel threads as illustrated in Figure 3. Specifically,
18 for "Player 1", the game is run at 34 from "Scene A" and for
19 "Player 2", the game is run at 36 from "Scene B". Input from
20 "Player 1" is determined at 38 and input from "Player 2" is
21 determined at 40. If "Player 1" enters input at 38, she is moved
22 at 42 to a different "Type-N" scene. Similarly, if "Player 2"
23 enters input at 40, she is moved at 44 to a different "Type-N"
24 scene. As will be described in more detail below with reference
25 to Figure 7, it is possible and desirable that both players will

1 eventually arrive at the same "Type-N" scene. This determination
2 is made for each player at 46, 48 respectively in Figure 3. At
3 this point it is worth mentioning that according to the presently
4 preferred embodiment, if interaction by either player with the
5 "world" of the game changes the world in any way, those changes
6 are perceived by both players. For example, if one player cuts
7 down a tree to make fire wood, when the other player goes to the
8 site of the tree, it is seen to have been cut down.

9
10 When it is determined that both players have entered the same
11 scene, the game switches to single-screen mode as illustrated at
12 50 in Figure 3. In this instance, the term "scene" means the same
13 visual display. As explained above, the input and movement
14 indicated at 38, 42 and 40, 44 in Figure 3 is intended to include
15 all of the typical types of actions and results encountered by a
16 player of an adventure game. In one sense, when in the split-
17 screen mode, the game of the invention seems to provide two
18 separate adventure games, one on either side of the screen, one
19 for each player. In another sense, each player is playing a
20 different part of the same game. Once it is determined at 46 or
21 48 (either player may enter the scene of the other) that both
22 players are at the same scene and single-screen mode is entered at
23 50, it may be immediately determined at 52 that cooperation is
24 required and the game will enter the "cooperation mode" at 54.
25 Alternatively, as mentioned above, both players may enter the same

1 scene where no cooperation is required. If such is determined at
2 52, the game will enter NCSS (non-cooperation single-screen) mode
3 at 56.

4
5 From the foregoing, it will be appreciated that the players
6 must discover when cooperation is required to advance the game
7 play. According to a preferred aspect of the invention, aural or
8 visual hints may be presented at scenes where cooperation is
9 required, but it is preferred that the players be required to use
10 intuition to discover when cooperation is necessary. In an
11 alternate, less preferred embodiment of the invention, it may be
12 clearly indicated to the players when cooperation is required.
13 This alternate embodiment is illustrated in Figure 4 where there
14 is no NCSS mode. That is, whenever the display changes to single-
15 screen mode, an action requiring cooperation is required to
16 advance in at least one direction. More specifically, as shown in
17 Figure 4, after the game is started at 120 and the prologue is
18 played at 122, it is determined at 124 whether the first single-
19 screen scene requires cooperation. This determination is made by
20 the game programmer, of course, and may be fixed for any
21 particular game or may be different each time the game is started.
22 For example, if the game may be started from different points in
23 the game play, it may sometimes be started at a point where
24 cooperation is needed and other times be started at a point where
25 no cooperation is necessary. If cooperation is necessary the game

1 enters cooperation mode at 128. If not, the game enters split-
2 screen mode at 126 and the game proceeds in two threads as
3 illustrated at 130-144 (much the same as described above with
4 reference to 30-44 in Figure 3). According to this embodiment,
5 however, the game only enters single-screen mode at 150 after two
6 conditions are met: it must be determined at 143 and 145 that
7 both players have reached a scene where cooperation is required
8 and it must be determined at 146 and 148 that both players have
9 reached the same scene. As stated above, according to this
10 embodiment, once single-screen mode is entered at 150, the game
11 immediately enters cooperative mode at 154.

12
13 In either of the embodiments described above with reference
14 to Figures 3 and 4, the cooperation mode preferably operates as
15 described with reference to Figure 5. Once the cooperation mode
16 is entered at 60, input from both users is polled at 62, 64, 66.
17 Only if it is determined at 66 that both players have entered
18 input is it determined at 68 whether the input was cooperative.
19 As mentioned above, one of the inventive aspects of the game is
20 that different kinds of cooperation are required to complete the
21 game. Thus, the determination made at 68 will depend on the type
22 of cooperation required at the scene. Examples of different types
23 of cooperation are described below with reference to Figures 9-11.
24 If the cooperation between the players is successful at 68, one of
25 the players or both of the players (depending on what type of

1 cooperation was required) will advance to a "Type-C" scene (i.e. a
2 scene which can only be reached with cooperation). Regardless of
3 whether one player advances to the scene or both players advance
4 to the scene, the scene may or may not require cooperation to
5 exit. This determination is made at 72 whether the scene entered
6 at 70 requires cooperation to exit. An example of game play
7 involving the determinations made at 68-70 would be where in order
8 to enter a room, one player must hold the door open while the
9 other enters. The door cannot be opened from inside the room and
10 it is spring loaded so that it will close unless being held open.
11 In this example, the determination of cooperation at 68 involves
12 determining whether one player is holding the door open while the
13 other player is entering the room. Clearly, in this example, only
14 one player will advance to the "Type-C" scene (interior of the
15 room) at 70. The determination at 72 will be that cooperation is
16 required to exit the room. Thus, after entering the room, the
17 game will remain in cooperation mode for the player to exit the
18 room. The game may be written so that the player who entered the
19 room may do things in the room (such as pick up objects) without
20 cooperation of the other player. In this case, the game will
21 enter NCSS mode at 74 until the player attempts to exit the room.
22 Alternatively, the game may be written so that the player who
23 entered the room can do nothing if the other player lets go of the
24 door and the game will remain in cooperation mode until the player
25 exits the room.

1 While the game is in cooperation mode, if only one player
2 supplies input as determined at 62, 64, 66, that input may move
3 the player to another "Type-N" scene as illustrated at 76.
4 Similarly, if both players supply input which is not cooperative,
5 both players may be moved to the same or separate "Type-N" scenes
6 as illustrated at 76. In either case, it will be determined at 78
7 whether both players remain in the same scene or whether one has
8 left to go to another scene. If either player has moved out of
9 the scene, the game will enter split-screen mode at 80. If both
10 players remain in the same scene, the game remains in cooperation
11 mode.

12
13 As mentioned above, according to a preferred embodiment, the
14 game may enter single-screen mode when no cooperation is required
15 but when the two players have entered upon the same scene. This
16 non-cooperation single-screen (NCSS) mode is illustrated in Figure
17 6. When NCSS mode is entered at 82, the game checks at 84 whether
18 cooperation is required and if it is, the game changes to
19 cooperation mode at 86. In NCSS mode the game also checks at 88
20 and 90 whether either player has left the scene, in which case the
21 game returns at 92 to split-screen mode. So long as both players
22 remain in the same scene and so long as cooperation is not
23 required the game remains in NCSS mode.

24

1 According to a presently preferred embodiment, cooperation
2 may also be required when the players are in the split screen
3 mode. Split-screen cooperation mode may be utilized in
4 cooperative situations which require, e.g. division of labor. For
5 example, a situation where one player must mind something where
6 another player goes to get something. Split-screen cooperation
7 mode is illustrated in Figure 7. The game play illustrated in
8 Figure 7 is similar in part to the game play illustrated in parts
9 of Figures 3 and 4 with similar reference numerals indicating
10 similar game play issues. In particular, after the game enters
11 split-screen mode at 326 and the game proceeds in two threads as
12 illustrated at 330-344 (much the same as described above with
13 reference to 30-44 in Figure 3 and 130-134 in Figure 4).
14 According to this embodiment, however, the game may enter
15 cooperative mode for either player while in split-screen mode. At
16 343 it is determined whether player 1 has entered a scene where
17 cooperation is required and at 345 it is determined whether player
18 2 has entered a scene where cooperation is required. In either
19 case, it will then be determined at 368 whether both players are
20 cooperating as required by the game program. If they are both
21 performing the required cooperation, one or both players
22 (depending on the program context) will advance to the Type-C
23 scene at 370. If it is determined at 368 that one player is not
24 cooperating, it is determined at 369 and 373 which player(s) is
25 not cooperating. For example, it may be determined at 369 that

1 player 1 is attempting cooperative game play but player 2 is not
2 (for any of a number of reasons) cooperating. In that case, the
3 game will enter a failure mode 1 as indicated at 371 in Figure 7.
4 What failure mode 1 entails will depend on the game program, at
5 what point the players are in the game, whether the cooperative
6 game play is critical, and other factors chosen by the game
7 programmer. A failure mode may be fatal in which case the game
8 will end or it may be repairable in which case the players will
9 have an opportunity to correct it. A similar determination is
10 made at 373 whereby the game enters failure mode 2 at 375 if
11 player 2 is attempting cooperative game play but player 1 is not
12 (for any of a number of reasons) cooperating. If neither player
13 is attempting cooperative game play, as determined at 373, the
14 game enters failure mode 3 at 377.

15
16 For purposes of determining when single-screen mode is
17 activated, the term "scene" means the same graphical display.
18 However, for purposes of advancing the game and determining when
19 cooperation is required, the term "scene" includes imperceptible
20 changes in the state of the game. For example, if one scene shows
21 a visual display of a locked door and a player inserts a key,
22 unlocks the door, and removes the key, the visual display may be
23 identical to the locked door, but the player has entered a new
24 "scene" in the game because now the door can be opened. Examples

1 of movement from scene to scene in this sense are illustrated in
2 Figure 8.

3
4 The diagram of Figure 8 shows circles, rectangles, and
5 trapezoids linked by lines with arrows and the indication "n" or
6 "c". The trapezoids indicate "Type-C" scenes. The circles and
7 rectangles indicate "Type-N" scenes. The rectangles indicate
8 "Type-N" scenes where cooperation may be used to enter a "Type-C"
9 scene. Movement by players from one scene to another is shown by
10 the lines with arrows. A line with an arrow at one end shows a
11 movement which is only "one-way". A line with an arrow at both
12 ends illustrates that movement can occur in both directions.
13 Lines labelled "n" indicate movements which can be accomplished
14 without cooperation. Lines labelled "c" indicate movements which
15 can only be accomplished with cooperation. Movement from a "Type-
16 C" scene may or may not require cooperation. Those skilled in the
17 art will appreciate that in an adventure game, it is preferable
18 that some scenes present many opportunities to advance in
19 different directions and that some scenes provide only a few
20 opportunities. In other words, some scenes will present many
21 challenges whereas some scenes are merely "eye candy".

22
23 Referring now to Figure 8, the starting point of the game
24 could be any scene shown in Figure 8 except for 224, 226, and 232
25 since those scenes can only be entered with cooperation. However,

1 if the game is started from a point in mid-play as explained
2 above, the "resumed" game could open in one of the "Type-C
3 scenes". In any event, as shown in Figure 8 scenes 200, 204, 210,
4 and 220 are "dead end" scenes where they must be exited back to
5 the scene from which they were entered. Scenes 208, 216, and 236
6 are "two door" scenes. When one of these scenes is entered the
7 player can exit back to the scene from which she entered or
8 proceed to another different scene. Scenes 202, 206, 212, 214,
9 and 218 are "multi-ported" in that many different scenes may be
10 entered from any one of these scenes. Multiported scenes are the
11 most interesting. Therefore, according to a preferred embodiment,
12 the scenes where cooperation is required are preferably
13 multiported with some ports requiring cooperation and some not.
14 For example, scene 222 may be entered without cooperation from
15 either scene 214 or 218 and either scene 214 or 218 may be entered
16 from scene 222 without cooperation. However, if and only if
17 cooperation is used, either scene 224 or 226 may be entered from
18 scene 222. Both "Type-C" scenes 224 and 226 are also multiported
19 and require cooperation for only some ports. From scene 224 one
20 may enter either scene 228 or 230 without cooperation but may not
21 return to scene 224 from either scene 228 or 230. In order to
22 exit scene 224 back to scene 222 from which it was entered,
23 cooperation is required. From scene 226, one may enter either
24 scene 216 or return to scene 222 from which it was entered without
25 cooperation. In order to advance to scene 232 from scene 226

1 cooperation is required. It will be noted however, that unlike
2 the "Type-C" scenes 224 and 226, scene 232 may be entered in two
3 different ways, either from scene 226 or from scene 234, but in
4 both ways cooperation is necessary. Once in scene 232, movement
5 to scene 234 does not require cooperation, but movement to scene
6 226 does require cooperation. As illustrated in Figure 8, entry
7 into some scenes may behave as "Type-N" scenes if entered in one
8 way and behave as a "Type-C" scene if entered in another way. For
9 example, scene 222 is a "Type-N" scene which can be entered from
10 scene 214, 218, or 226 without cooperation. However, from scene
11 224, entry into scene 222 requires cooperation. As used in the
12 example of Figure 8, a scene is called a "Type-C" scene only if it
13 cannot be entered without cooperation from any other scene.
14 However, whether or not a scene is called "Type-C" or "Type-N" is
15 not important. The important part of the invention is that some
16 scenes require cooperation for entry and that others do not. The
17 "hybrid" type of scene shown at 222 is neither necessary nor
18 sufficient for the game, but is an interesting addition. What is
19 necessary is that the game cannot be completed without
20 cooperation. For example, if game completion occurs at scene 232,
21 the players must cooperate at least once (if entering from scene
22 234), and possibly twice (if entering from scene 226) in order to
23 complete the game. According to a preferred embodiment, both
24 players advance to the completion scene together so that the game
25 cannot be completed by one player without the other player also

1 completing the game. An alternative, less preferred embodiment is
2 that in order to enter the final scene, one player must remain
3 behind. Which player remains behind may be determined by other
4 game activity which precedes the final scene or may be a decision
5 which is made by the players at the entry to the final scene.

6
7 As mentioned above, an important distinguishing aspect of the
8 presently preferred embodiment of the invention is that different
9 types of cooperation are required for the players to complete the
10 game. Figures 9-11 illustrate the determination (e.g., 68 in
11 Figure 5) of three different types of cooperation which are
12 contemplated by the invention. The determination of a first,
13 simple type of cooperation, such as one player opening a door for
14 the other, is illustrated in Figure 9. In this simple example
15 both players must be at a correct location and must enter the
16 correct input for there to be a determination that their input was
17 cooperative. Timing is not critical in this example. Thus, the
18 determination begins at 240 and looks at 242 to determine whether
19 Player 1 is in the correct location to input, e.g. at the door to
20 be opened. At 246 it is determined whether Player 1 input is
21 correct, e.g. click mouse button with pointer on doorknob. If
22 either of these criteria are not met, the game determines that the
23 input is not cooperative at 244. If both criteria are met, the
24 same kind of inquiry is made with respect to Player 2. In
25 particular, it is determined at 248 whether Player 2 is in the

1 correct location to input, e.g. at the door. At 250 it is
2 determined whether the Player 2 input is correct, e.g. click mouse
3 button with pointer in doorway. If all criteria are met, it is
4 determined at 152 that the players have entered cooperative input.

5
6 A more complex form of cooperation may require that both
7 players execute the correct input at the same time in the same
8 place, e.g. both players must simultaneously push a boulder to
9 move it out of the way or pull a rope together to move a boat as
10 shown in Figure 2. An example of determining this type of
11 cooperation is illustrated in Figure 10. Beginning at 254, both
12 players are simultaneously (or nearly simultaneously) polled to
13 determine at 256 whether both players are in the correct position,
14 e.g. at the boulder, and at 258 whether both players are
15 providing correct input, e.g. clicking and dragging in the same
16 direction simultaneously. If both criteria are met, it is
17 determined at 262 that the input was cooperative. If either
18 criteria is not met, it is determined at 260 that the input was
19 not cooperative.

20
21 An even more complex form of cooperation may require that
22 each player enter the correct input in the right place, at the
23 right time, and in the right sequence, e.g. Player 1 hands a tool
24 to Player 2 who must grab it without dropping it. An example of
25 determining this type of cooperation is illustrated in Figure 11

1 Beginning at 264, it is first determined at 266 whether Player 1
2 is in the right location, e.g. hand or pointer close enough to
3 Player 2 hand or pointer. It is next determined at 268 whether
4 Player 1 has entered the correct input, e.g. release mouse button
5 to drop the tool. If Player 1 has failed to meet either of these
6 criteria, it is determined at 280 that no cooperative input has
7 occurred. If Player 1 drops the tool at the right place, Player 2
8 must catch the tool before it hits the ground. Thus, at 270 a
9 timer is started and it is determined at 274 and 276 whether
10 Player 2 is in the right place entering the right input, e.g. hand
11 or pointer close to Player 1 hand or pointer and pressing mouse
12 button after Player 1 releases the tool. If, as determined at
13 276, Player 2 has not acted fast enough, it is determined at 280
14 that no cooperative input has occurred. If both players have
15 entered the correct input in the correct places, in the correct
16 order, in a timely manner, it is determined at 278 that the input
17 was cooperative.

19 Still another type of cooperation contemplated by the
20 invention has been referred to above as a "division of labor"
21 cooperation which may take place in a single screen mode or a
22 split screen mode. The concept of this type of cooperation is
23 easy to explain without the use of a diagram. For example, a
24 typical "division of labor" cooperation may require that one
25 player keep a campfire alive while the other go get more wood to

1 burn. Those skilled in the art of game programming will
2 appreciate from this example how other game play scenarios could
3 be made into a "division of labor" cooperation requirement.
4

5 Those skilled in the art will appreciate that most successful
6 computer games have a soundtrack which includes sound effects and
7 music. From the foregoing, it will be understood that when the
8 game is in split screen mode, it may require the playing of two
9 soundtracks, one for each player. This may be accomplished in
10 several ways. The simplest way is to simply play the two
11 soundtracks simultaneously. However, it may be desirable, where
12 the game computer is provided with stereo speakers, to play one
13 soundtrack through the right speaker and the other through the
14 left speaker. Alternatively, separate soundtracks may be provided
15 for two headsets (one for each player) which are coupled to the
16 computer. Technology for implementing multiple simultaneous
17 soundtracks is disclosed in U.S. Patent Number 5,556,107 the
18 complete disclosure of which is hereby incorporated by reference
19 herein.
20

21 As mentioned above, another important aspect of the presently
22 preferred embodiment of the invention is that the game play be
23 related to a story and that the cooperation between the players be
24 closely related to aspects of the story. A good example of a
25 story which is well suited to adaptation for use as a game

1 scenario according to the invention is "Baby Island" by Carol
2 Ryrie Brink, ©1937 The Macmillan Company, the complete text of
3 which is hereby incorporated by reference herein.

4
5 EXAMPLE

6
7 The Baby Island story begins with two characters taking a
8 voyage from San Francisco to Australia. What follows herein is a
9 synopsis of a portion of the Baby Island story with comments
10 regarding how the story can be adapted for use with the invention.

11
12 The Prologue of the Game

13 The first chapter of the Baby Island story serves well as the
14 opening prologue of a game according to the invention.

15 On a boat from San Francisco to Australia, two motherless
16 girls, Mary Wallace, age 12, and her sister Jean, age 10, have
17 left their Aunt Emma after two years to go live with their
18 father on the new ranch he had started. Hit by a tropical
19 storm, the boat began to sink. Mary, who had been amusing
20 herself on the boat trip by playing with the 3 Snodgrass
21 babies, 20-month-old twins Elisha and Elijah and 4-month-old
22 Jonah, plus little Ann Elizabeth Arlington, age 1 year, kept her
23 wits about her in the chaos of the sinking boat. She rounded up
24 the 4 babies and Jean and got them all into a lifeboat to await
25 the babies' parents. Amidst much confusion, their lifeboat

1 was cast off. Fog and darkness closed in and "at last Mary
2 realized with a strange thrill that she and Jean were adrift on
3 an unknown sea with a boat full of parentless babies."

4 One can easily imagine how this introduction would make an
5 excellent animated prologue to a game made in accord with the
6 present invention. At the end of the prologue, a game for two
7 players begins based on the story which follows in the second
8 chapter of Baby Island. One player plays the part of Mary and the
9 other player plays the part of Jean.

10
11 The First Game Scene-Example of Division of Labor Cooperation

12 The first game scene is drawn from the second chapter of the
13 Baby Island story.

14 The next morning, the sun rose, the seas calmed, and 4
15 babies woke up and screamed for milk. Mary instructed Jean to
16 either look for something to eat or to hold and rock the babies.
17 Jean found under the seat of the lifeboat: 2 hatchets, a
18 lantern, a can of oil, blankets, a coil of rope, canvas which
19 seemed intended for a sail, a tin bucket, canvas bucket,
20 wrench, bailing tins, and a tin box of matches.

21 This scene from the second chapter of the story is readily adapted
22 to the game according to the invention with some modifications.
23 In the game, Mary need not "instruct" Jean. However, one of the
24 players must hold and rock the babies while the other player
25 searches. This is the first cooperative game play required by the

1 invention and it is a "division of labor" type of cooperation.
2 The discovery of the supplies under the seat of the lifeboat is a
3 classic adventure game scenario. It will be understood that at
4 least some of the supplies will be required at some point in the
5 game. According to the invention, the game will not advance
6 unless one player is holding and rocking the babies while the
7 other player searches. There are various ways the game can be
8 programmed to accomplish this. One possibility is that the seat
9 of the lifeboat will not be able to be moved by one player unless
10 the other player is holding and rocking the babies. Another
11 possibility, though perhaps too morbid, is that the babies fall
12 overboard and drown unless one player holds and rocks them. The
13 division of labor game play in this scene is most suited to take
14 place in a single screen mode.

15
16 The second chapter of the Baby Island story contains several
17 other scenes in which cooperative behavior of the two players will
18 be required including finding other supplies and feeding the
19 babies. The Baby Island story also contains many scenes which are
20 readily adapted to provide individual game play for each of the
21 players.

22
23 Examples of Individual Game Play and "Temporal Cooperation"

1 The third chapter of Baby Island includes several scenes
2 which are readily adapted to provide individual (non-cooperative)
3 game play according to the invention.

4 In Jean's pockets were found more supplies: ball of
5 string; piece of tin foil; chain of safety pins; a pencil; and a
6 half-written postcard to Aunt Emma. Jean had promised Aunt
7 Emma she would write her every week, so she wrote the rest
8 of the post card: "We are on our way to a desert island with
9 the Snodgrass babies and Ann Elizabeth Arlington. The boat in
10 the picture was wrecked. We're in a fine little lifeboat". She
11 folds the notecard, wraps it in the tin foil, puts it in the
12 empty beef can, bends down the cover and sets the can floating
13 across the water.

14 As it turns out in the Baby Island Story, it is crucial that Jean
15 continue to send notes floating across the water every week in
16 order for the children to be found and rescued. Therefore, the
17 player who plays the part of Jean must, throughout parts of the
18 game, send such a note. It will be appreciated that the game
19 could provide some hint that this must be done. A hint can be
20 provided by showing that the note on the first note card says
21 something like "As I promised to write to you each week...".
22 Another interesting way to provide a hint would be to show an
23 audio-video animation in a cloud above Jean's head when she finds
24 the note cards. The animation would show Jean promising Aunt Emma
25 that she would write weekly. In addition to requiring Jean to

1 write weekly notes, the Baby Island story provides a separate
2 activity for Mary.

3 In Mary's pockets were found: a purse with a few coins;
4 a notebook with a calendar; and a case with scissors, thimble,
5 needles and thread. Mary began keeping a ship's log:

6 "September 21 - At sea - expect to reach a desert island soon."

7 Mary's keeping track of the calendar is also an important part of
8 the game. As the game obviously will not be played for weeks at a
9 time, periodically Mary's calendar will show what date it is. The
10 calendar plays an important role later in the story. These
11 independent activities of the players may take place in a single
12 screen or in a split screen mode. Moreover, these "independent"
13 activities may be temporally related so that performing these
14 activities in sequence is a type of cooperation. For example,
15 Mary may be required to tell Jean when it is time to send another
16 postcard, based on the date indicated in Mary's calendar.

18 In other words, cooperative game play can be defined to mean
19 a situation in which there is a required temporal relationship
20 between activity X by player A and activity Y by player B such
21 that the game can only be completed if the temporal relationship
22 is satisfied. According to this definition, non-cooperative game
23 play can be understood to be when player A can perform activity X
24 without dependence on player B or negative impact on the
25 successful completion of the game.

1 Some independent activities may be "assigned" by the story to
2 the players. Other independent activities may be performed by
3 either player at their option.

4 The day goes on with no land in sight. During the heat,
5 the girls stretch the canvas over one end of the boat to shelter
6 the babies from the sun. As they nap, Mary washes their
7 clothes. Night falls; all asleep with blankets as it gets cooler.
8 Baby Jonah begins screaming with colic, and screams till Mary
9 figures out she needs to burp him.

10 According to the invention, either Mary or Jean may wash the
11 clothes so long as one of them does. In addition, either Mary or
12 Jean may burp baby Jonah so long as one of them does.

13 14 Single Screen Coordinated Cooperation

15 According to the description of the invention, one form of
16 cooperation envisioned by the inventors is a coordinated
17 cooperation in which both players must act simultaneously on a
18 particular object in order to accomplish a task. The Baby Island
19 story provides scenes where this type of cooperation can also be
20 mandated in a game. For example, in chapter four, both players
21 must pull the lifeboat ashore.

22 They sail through the night and then, with a gentle bump,
23 the boat is grounded on a sandy island. Jean wakes up first and
24 leaves the others sleeping in the boat, disappears and comes
25 back having found bananas - breakfast for all.

1 They decide to pull the boat as far up shore as possible,
2 so the wind won't carry it out to sea. They leave the babies on
3 the sand and with all the strength of the 2 of them together,
4 they pull and push the boat up the dry sand.

5 Unless both players pull and push together the boat will not be
6 beached and the game will not be completed. Clearly, this
7 cooperation is most likely to require single screen mode.

8 9 Complex Coordinated Cooperation

10 Chapters six and seven of Baby Island provide many
11 opportunities to implement complex coordinated cooperation
12 requirements. In these chapters, Mary and Jean undertake several
13 building projects.

14 They decide to build a tepee. First they need poles: Jean
15 goes off and finds a bamboo grove and cuts down some bamboo
16 poles with the hatchet and brings them back. They strip the
17 leaves off and stick them in the ground in a circle and tie the
18 tops together with a piece of rope, then use the canvas sail as
19 a tepee cover. They make beds of boughs and leaves and spread
20 the tarpaulin over them to keep them dry, then put blankets on
21 top.

22 * * *

23 They build a "pen" to keep the babies from wandering -
24 they drive sharpened sticks into the ground close together.

1 They build a "pram" to transport the babies without
2 having to carry them. They take a litter of boughs and tie them
3 together with vines and a little of the rope. More vines and
4 rope are made into a double harness for the girls to put around
5 their shoulders.

6 Each of these building projects may be made to require complex
7 coordination such as one player handing an object to another, etc.

8
9 There have been described and illustrated herein several
10 embodiments of a multiplayer electronic game. While particular
11 embodiments of the invention have been described, it is not
12 intended that the invention be limited thereto, as it is intended
13 that the invention be as broad in scope as the art will allow and
14 that the specification be read likewise. In particular, while
15 several different types of cooperative game play have been
16 disclosed, it will be appreciated that other types of cooperative
17 game play may be implemented within the scope of the invention.
18 Also, while the split screens were shown as side-side split
19 screens, it will be appreciated that the screen could be split
20 into upper and lower sections, or in a diagonal matter. It will
21 therefore be appreciated by those skilled in the art that yet
22 other modifications could be made to the provided invention
23 without deviating from its spirit and scope as so claimed.